# SCIENCE

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## FLAX CULTURE IN RUSSIA.

FLAX is cultivated in all parts of European Russia for local consumption, but, according to a recent report by the United States consul at Odessa, it has an importance for manufacture only in twenty-three governments, which sow more than 3,105,000 acres in flax, the remaining twenty-seven governments sowing less than 675,000 acres. With regard to the object for which flax is sown, European Russia can be divided into two regions, the northern and the southern. In the first flax is sown chiefly to obtain the fibre, although with the fibre seed is also obtained, and in the second nearly exclusively for the seed. The northern region of the cultivation of flax for manufacturing purposes extends from the south-eastern part of the Baltic Sea to the central part of the Ural Mountains, within which are the governments of Livonia, Kovno, Vilna, Vitebsk, Pskov, Smolensk, Tver, Yaroslav, Vladimeer, Nijni Novgorod, Kostroma, Vologda, Viatka, and Perm. More flax is cultivated in the governments of Viatka and Pskov than in the others. In the first about 251,000 acres are sown in flax, and in the second about 221,000 acres. These two provinces may be considered as the centres of the cultivation of flax, around which the other flax-producing provinces are grouped. The yield of flax per acre in these provinces is very different, and depends on the quality of the soil in which the flax is sown. An acre of good land gives 400 pounds or more of fibre and from 400 to 535 pounds of seed, but an acre of poor, exhausted soil will not yield more than 160 to 200 pounds of fibre and about 265 pounds of seed. The average yield for the entire region may be considered to be from 265 to 330 pounds of flax fibre and 400 pounds of flaxseed per acre.

The southern region of the cultivation of flax for the sake of the seed consists of the following territory and governments: The Don-Cossack territory, sowing 262,000 acres; Yekaterinoslav, sowing 251,000 acres; Kherson government, sowing 175,000 acres; Taurida (Crimea), Samara, Saratov, Voronezh, Tambov, and Poltava. In the last two provinces flax is grown both for the seed and fibre. Flax for the seed is mostly sown either in virgin soil or in old fallow lands. The yield of seed in this region varies from 400 to 670 pounds and more per acre, and, for an average, may be estimated to be about 535 pounds per acre. The total harvest of flaxseed for all of European Russia attains to about 1,800,000,000 pounds. Considering the average value of the flax fibre to be $186 per ton, and that of the seed to be $44.10 per ton, it will be seen that the value or gain to Russia from the cultivation of flax is about $112,000,000 annually.

The advantages derived from the cultivation of flax would be far more if the qualities of the Russian fibre would correspond with its quantities, and if a larger portion of it were to be exported in a manufactured state. As regards its quality, Russian flax is not only surpassed by Irish flax, but also by flax of many other countries of western Europe (Belgian, Dutch, French, and Bohemian), and is valued in foreign markets lower than any other flax. The low qualities of the Russian fibre are not the results of natural causes, but of the ignorance as to the proper method of treating the flax. The cultivators of flax are chiefly peasants, who partly do not know, and partly do not possess the means to acquire, the latest improvements in the primary technical manipulation of the fibre. Another cause of the imperfect working out of the flax is to be found in the absence of a home demand for a high quality of fibre. Russian factories do not produce linen from the finest numbers of thread, and therefore do not require the highest class of flax. This latter circumstance is unfortunate, as it is a strong impediment to improvements in the manipulation of the flax fibre.

The aim of the producer is a large quantity rather than an improved quality, and the result is a progressive reduction in the fibre. Of late years this has become particularly apparent in the government of Pskov. Formerly Pskov flax had a high reputation all over Russia, but now it is quoted much lower than flax from Velogda, Kostroma, Yaroslav, and Tver. About one-half of the flax fibre produced in Russia is exported abroad only half worked (the unbrushed fibre together with the tow), and the greater part of the fibre remaining in the empire is worked up by the peasants in their farmhouses into thread and linen for their own use, as well as for sale. A much smaller part of the flax goes to the spinning and weaving factories, which are chiefly situated in the governments of Vladimeer, Kostroma, and Yaroslav.

As regards the internal or home trade of flax, it is almost entirely in the hands of small dealers, who drive from village to village and make their purchases in small lots. The flax thus collected is then sent in considerable quantities to the towns which serve as centres to the flax trade.

The *Linum usitatissimum vulgare* and *crepitans* are being cultivated in Russia in several varieties of both kinds, but the difference in these varieties is so slight and they so easily blend that even those initiated in the trade of the article often fail to perceive it. Both have blue blossoms and occasionally white blossoms. The blue-blossom varieties are preferred. About 21,000,000 bushels of seed are annually raised in European Russia.

Flaxseed, as understood in Russia, comprises sowing seed and crushing seed. The first named is a more carefully sorted quality, exported exclusively for sowing purposes. Crushing seed is the surplus seed of the flax plant, which is exported for making oil, etc., as there is no demand for it as sowing seed. With this quality the seed received from the interior is mixed and the whole exported as crushing seed. Of the total quantity exported, viz., 13,000,000 bushels, about two-thirds is described as sowing seed.

The seed is sown in April, May, and early in June. It is sown earlier in the south and south-east than in the centre, west, and north; much depends on whether the seasons are early or late. The harvest begins as early as July and as late as August and September, earlier in the south and later in the north. The number of bushels of flaxseed raised per acre depends on the object to be attained; when the seed is the object, a much less quantity is sown per acre, and when the fibre is desired, a much larger quantity is sown. In the south and east of Russia a little over a half bushel per acre is sown, and the yield is about ten bushels. In those parts of central Russia where the fibre is not utilized, a little over four-fifths of a bushel is sown, and the yield is about ten bushels. In western Russia and those parts of central Russia where the fibre is utilized, a bushel to a bushel and a half per acre are sown, and about five bushels is the yield. In northern Russia, where the fibre is the chief consideration, nearly three bushels per acre are sown, which gives about six bushels of seed and from three hundred to six hundred pounds of fibre.

Flaxseed is usually sown by hand, and the land should be carefully prepared and be of good quality. The ploughing should not be less than nine inches in depth, and the land should be as free as possible from weeds, and thoroughly prepared beforehand for the reception of the seed. After the sowing, the seed is covered by passing a harrow once or twice over the ground. Moist and mild weather favors the development of the plant in all of its parts; a hot and dry climate, with occasional showers, will produce a good development of the seed, but the fibre is usually coarse and brittle, as the lignin parts of the stems then develop at the expense of the fibre. The cultivation of flax, whether for seed or fibre, requires for its proper development a rich and black loam (ten to fourteen inches) having a clay subsoil. Good crops, however, are grown whether the subsoil is gravel or gray sand.

The lesson to American farmers, especially those of the North-west, which the total product of the cultivation of flax in Russia furnishes will be readily appreciated and understood. The possibilities which the cultivation of the flax fibre offers to Western farmers is only equalled by the surprise that such possibilities have thus far been neglected. The seed has been cultivated with more or less satisfactory results in the United States, but the fibre practically not at all. The climate, soil, and conditions generally throughout the North-west are very favorable to the cultivation of the flax fibre as well as the seed. After a short experience, as to the primary manipulation or handling of the flax fibre, our farmers would produce flax which would compare favorably with the best varieties of the fibre. It seems strange that a practical people like ourselves should for years have been satisfied to cultivate flax for the seed at a value of about fifteen dollars per acre, and at the same time allow six hundred pounds of flax fibre per acre to rot on the ground, this flax fibre having a value, after being manipulated, of $186 per ton.

Familiar as our farmers are with the working of improved and expensive agricultural machinery, and the latest developments of the human intellect as applied to the soil, they may always learn something by watching the working of rude ideas as seen in a primitive and unsophisticated people. The main difference between the old and the new system of farming is not one of method, but of expense; and, as physicians never really know what a disease is capable of until they see an outbreak in virgin soil, so it is not possible to fathom all the possibilities of the most commonplace notions and devices until we see them applied with the unconventional freedom and simple directness that belong to comparatively primitive peoples. The Russian peasant is both simple-minded and ignorant. He clings to old methods as much from liking as for the expense which new methods involve. From the flax fibre, by the aid of his primitive and rude contrivance, the Russian peasant produces linen, thread, crash, and other valuable and necessary articles for the use of his family and for sale. It does not require the aid of expensive machinery to make the flax fibre either useful or valuable. The rude machines which the Russian peasant employs are the handiwork of some village carpenter or wheelwright, and are made at a comparatively small cost. If the Russian peasant farmer accomplishes such results, the American farmers, who possess like conditions of climate and soil, should accomplish much more.

The unsatisfactory condition of our farmers in our north-western States, which is certainly due to the overcultivation of wheat, with its yearly decreasing yield per acre, renders it all the more important that a speedy means be found to relieve a condition of things which affects the material interest and welfare of the great majority of the people of the United States. Such a means exists in the flax plant. It will not only enable farmers to make their own linen, rope, thread, crash toweling, oil cake, and much besides, but will cause new industries to be established throughout the country in districts where the advent would be both profitable and new. There should be a general and persistent effort made to encourage the cultivation of the flax fibre throughout the United States, with the view of establishing factories for the manufacture of twine or textiles, and, if our consul's report should develop a proper interest in so important a subject, the result can not fail to be satisfactory.

## HEALTH MATTERS.

### The Anæsthetic Action of Nitrogen.

WHILE some writers maintain that the anæsthetic action of nitrous oxide is due to its preventing access of free oxygen to the system, others believe that it has a "specific anæsthetic action." It occurred to Dr. G. Johnson (*Lancet*, April 11) that some light might be thrown upon this subject by the administration of pure nitrogen. Accordingly he obtained a cylinder containing 100 cubic feet of compressed nitrogen, in which the proportion of oxygen present was only 0.5 per cent by volume, with 0.3 per cent of $CO_2$. As a preliminary trial, Mr. F. W. Braine administered this gas in five instances to members of the staff of King's College, who volunteered to submit to the experiments. The result was in each case the production of complete anæsthesia and of general phenomena precisely similar to those observed from the inhalations of nitrous oxide. Encouraged by these results, Mr. Braine felt justified in administering the gas to patients at the Dental Hospital for anæsthetic purposes. Nine patients took the gas. In every case the result was the production of complete anæsthesia, with general phenomena similar to those observed during nitrous oxide inhalation. The pulse was first full and throbbing, then feeble. In the advanced stage the respiration was deep and rapid, and there was lividity of the surface; the pupils were dilated, and there was more or less jactitation of the limbs. The only difference, in the opinion of some of those present, being that the anæsthesia was less rapidly produced, and somewhat less durable, than that from nitrous oxide, though in each case the tooth was extracted without pain.

On a subsequent occasion the same gas was administered by Dr. Frederic Hewitt at the Dental Hospital. As before, nine patients took the gas, The maximum period required to produce anæsthesia was 70 seconds, the minimum 50 seconds, and the mean time 58.3 seconds. In one case two teeth were extracted without pain. In one case only was pain experienced, and in that case, the tooth having been broken up and not extracted, the patient said she felt a "smashing up."

Having on several occasions witnessed the administration by Dr. Hewitt of nitrous oxide mixed with ten per cent by volume of oxygen, with the result of producing anæsthesia without lividity or jactitation, Dr. Johnson determined to try a mixture of nitrogen with a small proportion of oxygen. He therefore obtained from the same source of supply a cylinder containing forty cubic feet of nitrogen mixed with three per cent by volume of oxygen, and a second cylinder equally charged with a mixture of nitrogen with five per cent by volume of oxygen. These gases were administered by Dr. Hewett to patients at the Dental Hospital with the following results. In the case of the three per cent gas, which was given to five patients, the time required to produce anæsthesia varied from 60 to 75 seconds, the average time being 67.5 seconds. In each case the tooth was extracted without pain, the duration of anæsthesia being somewhat longer than with pure nitrogen. In each case there was lividity, dilatation of pupils, and more or less jactitation. On the same day Dr. Hewitt gave nitrogen with five per cent oxygen to four patients. With this mixture the time required for the production of anæsthesia ranged from 75 to 95 seconds, the average being 87.5 seconds. In each case there was complete anæsthesia, during which one patient had three molars extracted, and, although she said she "felt the two last," the sensation appears to have been that of a pull, and not of acute pain. In all of these four cases there was slight lividity before the face-piece was removed, but in only one case was there slight jactitation of the limbs. The other three patients were perfectly quiescent.

The experiments here recorded suffice to prove that nitrogen, pure or mixed with a small proportion of oxygen, is as complete and apparently as safe an anæsthetic as nitrous oxide. It is to be hoped that those who are engaged in the administration of anæsthetic gases will investigate this interesting subject further, with a view to ascertain whether atmospheric air, partially deprived of its oxygen, may be advantageously substituted as an anæsthetic for nitrous oxide.

### Treatment of Phthisis.

According to the *Lancet*, Dr. Germain-Sée, in his new method of treating phthisis, shuts his patient up for two, three, or more hours daily in a hermetically closed metallic chamber, into which is slowly admitted a current of compressed air, which, having passed through a mixture of creosote and eucalyptol, is saturated with the vapor of these substances. Since August last ten cases of phthisis have been submitted to this treatment, all of which cases, with one exception, had reached the period of softening, and bacilli had been detected in the sputa. The results obtained were return of appetite, even in advanced cases, gain of weight and strength, fall of temperature to the normal in a week or two, disappearance of hæmoptysis, diminution of cough and of purulency

of sputa, and cessation of dyspnœa. It is claimed that the method reduces the malady to a purely local lesion, all the general symptoms disappearing, even though *râles* may persist. M. Sée related the history of seven of his cases, all of which were relieved and some actually cured. The treatment has been efficacious in fetid bronchitis.

### The Physiology of Asphyxia.

That the immediate cause of death from asphyxia, says a writer in the *Lancet*, is the arrest of the pulmonary circulation appears to be proved by the following facts: (1) When the chest of an animal is opened immediately after death caused by ligature on the trachea, the right cavities of the heart are found enormously distended, while the left are comparatively empty. (2) When the heart of an animal is exposed during the progress of asphyxia the right cavities are seen to become distended, while the left cavities, which had been previously gorged, are found to be collapsed and comparatively empty. (3) In the last stage of asphyxia there is a continuous increase of pressure in the pulmonary artery, while the systemic arterial pressure is falling. (4) That the arrest of the circulation through the lungs is due to contraction of the pulmonary arterioles appears to be proved by the influence of agents which are known to paralyze the arterioles, — e.g., nitrite of amyl, atropine, and an excessive dose of curare, the effect of which is that deprivation of air is unattended by distension of the right cavities of the heart, and other evidence of obstructed pulmonary circulation, the life of the animal is prolonged for several minutes, and death ultimately results from the toxic action of venous blood upon the cardiac and nervous tissues. (5) It is an acknowledged fact that these paralyzing agents act alike upon the systemic and the pulmonary arterioles, but the successive phenomena of asphyxia are absolutely inconsistent with the idea that the distension of the right side of the heart is a result of systemic arterial obstruction acting backwards through the left cavities of the heart and the lungs.

### The Effect of Strychnine on the Stomach.

The effect of nitrate of strychnine on the functional activity of the stomach has been recently made the subject of a careful research by Dr. Gamper of St. Petersburg, who employed for the purpose of his experiments four healthy young hospital assistants. He found, as stated in the *Lancet*, that strychnine increased the amount of gastric juice secreted, the general acidity, and the quantity of free acid in the secretion. It also hastened the absorption from the stomach, and strengthened the mechanical movements. Its effect, too, continued for some time after its administration had been stopped. Like many other Russian observers, Dr. Gamper seems to have been highly impressed by the value of strychnine in chronic alcoholism, declaring that it is the most effective of all drugs in such cases. The thesis contains a long list of references to the literature of the stomach affections published in six or seven languages during the last ten years.

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## NOTES AND NEWS.

THE wonderful properties of nitrate of soda are just now being strikingly exhibited at the Ohio Agricultural Experiment Station, where wheat is being grown continuously under different methods of fertilizing. Although the nitrate was not applied until the middle of April, yet it has stimulated such a tremendous growth that the plots which have received nitrate in large quantity carry nearly twice as great a weight of vegetation as can be found on those which have had no nitrate.

— Four trials were conducted at the Wisconsin Agricultural Experiment Station during the fall and winter of 1890–91, under the direction of W. A. Henry, for the purpose of ascertaining the value of sweet whey for pig feeding. The results of the trials show: (1) That pigs can not be successfully maintained on whey alone. (2) Pigs fed on corn-meal and shorts with water required 552 pounds of the mixture for 100 pounds of gain. (3) When whey was added to the corn-meal and shorts mixture, it produced a marked saving in the amount of grain required for good gains. This was true for mixtures varying from two pounds of whey to one of grain, up to ten pounds of whey to one of grain. (4) It was found when using whey as a partial substitute for grain, that 760 pounds of whey effected a saving of 100 pounds of the corn-meal and shorts mixture. (5) Using these figures, if corn meal and shorts are valued at twelve dollars per ton, then whey is worth eight cents per hundred pounds; at fifteen dollars per ton for the corn-meal and shorts, whey would be worth ten cents per hundred pounds. (6) Shorts, pea-meal, and oil-meal, or like feeds, should be mixed with whey for growing animals. Some corn may be fed at all times, the proportion increasing as the animal approaches maturity.

— On Feb. 15 there occurred at Glasgow, Scotland, says *Fire and Water*, one of the most remarkable explosions of gas upon record. The illuminating-gas plant of Glasgow is the property of the municipality, and comprises three different stations. The one in question, known as Dawsholm, is situated in a somewhat isolated position outside the town, and includes three gas-holders arranged in line, about twenty-five feet apart, but fortunately as it turns out, at some little distance from the rest of the buildings and plant. The three gas-holders are all similar in respect to diameter, being 160 feet across. Two of these have lately been enlarged by the addition of a third lift, which made them 90 feet in height, and equal to containing more than 1,500,000 cubic feet of gas each. The third remained a double lift, consequently about 60 feet high, and holding something over 1,000,000 cubic feet of gas when full. At about 4.30 in the afternoon the outlet valve of No. 1 was open for the supply of the district, No. 2 shut off, and the inlet of No. 3 was open to receive the make of gas. The valve man opened the inlet of No. 2, with a view, apparently, of diverting the make from No. 3. At this time No. 1 was three parts or more full, No. 2 a little less, but sufficient to cup the lower lift, and No. 3 was not far from being full. Before the man could complete his purpose by closing No. 3 inlet, a large mass of flame was observed shooting high into the air, over the roof of No. 2, the centre holder. It was accompanied by a loud rumbling noise like the shock of an earthquake, together with a concussion that caused windows to rattle violently, and greatly alarmed the inhabitants of the neighboring part of the town. This appears to have been caused by the bursting of the roof of the gas-holder in all parts. It was quickly followed by the destruction, with a second concussion, of No. 1 holder, and in a few minutes the whole structure of both holders lay in a confused mass at the bottom of the tanks. Fortunately this was unattended with loss of life or serious injury. Workmen who happened to be in the vicinity were scorched, and some haystacks one hundred yards off were set on fire; but the enormous volume of some 3,000,000 cubic feet of gas appears to have passed steadily up into the air, and burnt away as fast as it could meet with sufficient oxygen to support combustion. The whole affair was over in four or five minutes. The experts report that they are satisfied that the holders did not contain any explosive mixture, nor did they possess structural defects. But there were "indications of an explosive material having been placed on the crown of No. 2." The explosive power, striking inward, ruptured No. 2, and the concussion was considered sufficient to account for the damage to No. 1. The "indications" appear to be an irregular fracture, having the edges bent inward, and corroded as if by the action of chemicals.

— On Feb. 6 a discovery was made in the necropolis of Thebes which the *Academy* considers second only in importance to the discovery of the royal mummies at Dehr-el-Bahari by M. Maspero, in 1881. About half a mile from Dehr-el-Bahari a pit has been found containing several hundred magnificent mummies. These, like the royal mummies, had evidently been removed from the tombs and concealed in this receptacle, as a precaution, by the servants of the priests, probably at the same time and for the same reasons which caused the royal mummies to be placed in the receptacle where they were found by M. Maspero. This removal is believed by M. Maspero to have taken place in the reign of Aauputh, son of Shasang, of the Twenty-second Dynasty. The coffins hitherto found all belong to the Twenty-first Dynasty, and are those of the priests Ra Amun and their families. The pit is

about forty-five feet in depth, at the bottom of which are two corridors filled with coffins and treasures of every description. In the lower corridor — which as yet has only been explored — it is computed that there are some two hundred coffins, and the second corridor is believed to be not less extensive. The shaft is forty-five feet deep, its mouth is about twelve feet in diameter, and its sides are of rough limestone. One of M. Grébaut's native assistants, who was superintending the work of hauling up the mummy-cases, says that he had been the first actually to enter the corridor where the mummies and treasures lie. The shaft had been excavated only as deep as the mouth of the corridor; and he crept in on his hands and knees, and stood in what he describes as being like a palace of enchantment. The corridor, he said, is some ten or twelve feet high and two hundred and fifty feet long. It runs in a northerly direction from the shaft toward the Theban hill. At the end there is a short corridor branching from it at right angles, and at some height above the floor at the end is the entrance to a second very long corridor, full of treasures, which has been sealed up for the present by M. Grébaut. Groups of mummies are placed at intervals in families. The number in each group varies from two to six or seven, father, mother, and children, and around them, exquisitely arranged, are vases, models of houses, models of *dahabiehs*, cases and boxes full of *ushabtis*, statuettes, and every conceivable treasure of ancient Egypt. Without even a speck of dust upon them, this profusion of treasures had remained unlooked at by any eye for nearly three thousand years. He said that photographs had been taken of the place in its undisturbed state, which he declared to be that of a perfectly-kept and well-arranged museum.

— The ceremony attending the burial of Prince Chun, the late prime minister of China, and father of the emperor, is said, by *The Missionary Herald*, to have been one of the grandest sights ever witnessed in Peking. No burial takes place in China till the astrologers and geomancers have fixed upon a lucky day and a lucky place for the event. On this occasion the astrologers fixed upon four o'clock in the morning as the auspicious time. As the procession started the emperor knelt in front of the coffin and bowed his head three times, each time crying aloud. Others went through the same ceremony, and then the coffin was taken up by eighty bearers. These bearers were clad in blue silk costumes. The pall was a splendid piece of crimson silk covered with gilt embroidery. Then came eight handsomely caparisoned camels and twelve milk-white horses, and men in gorgeous dresses; then four men leading small white dogs; then great crowds of men carrying flags. The umbrellas borne were a special feature. Then came a man bearing a crooked-handled umbrella, which is only carried by the emperor. Then followed images of lions, deer, and storks, all wrought in evergreen shrubs. It was a magnificant sight for Peking. But this is not the end of the funeral; the body will remain in the temple for a long time, and then will be carried with much ceremony to the imperial cemetery.

— Bulletin No. 79 of the New Jersey Agricultural Experiment Station reports an experiment in the use of nitrate of soda as a fertilizer of tomatoes, being a repetition of a similar experiment made in 1889. The experiment was made on plots of one-twentieth of an acre. The land was a sandy loam, level, well drained and in a good state of cultivation. It had been used for more than ten years in growing market garden crops, and had been uniformly cropped and fertilized for the three preceding years. The nitrate was applied, either altogether at the time of setting out the plants, or half at that time and half five weeks later, being spread broadcast. (It should never be used in the hill, as it is liable to kill the plants when used in this manner.) It was used at the rate of 160 and 320 pounds per acre, either alone or in connection with superphosphate and potash. The result was a very marked increase of crop in every case in which the nitrate was used, the most profitable increase coming from the use of nitrate alone, which paid a handsome profit in every case in which it was thus used. The experiments of the two years agree in showing that nitrate of soda, while increasing the yield, did not do so at the expense of maturity when a small quantity was used, or when a large quantity was used in two applications; but that the yield was increased at the expense of maturity when a large quantity was used in one application. Experiments made at the Ohio Experiment Station leave room for doubt whether, on a strong clay loam, tomatoes would respond so profitably to nitrate of soda as they did in New Jersey; but the trial is so easily made that tomato growers are recommended to experiment for themselves. Any dealer in commercial fertilizers should be able to supply the nitrate.

— At the seventh annual meeting of the Kansas University Science Club, May 29, 1890, papers were read as follows: "On the Chemical Analysis of a Meteorite from Tonganoxie, Kansas," by E. H. S. Bailey; "A Natural Alum from Texas," by E. E. Slosson; "Notes on Periodicity in Rainfall," "Probable Temperature of the Summer in Lawrence," and "Maximum Movements in Beams," by E. C. Murphy; "Notes on some Tertiary Conifers," and "On the Variations of Anas Obscurus," by V. L. Kellogg; "The Alkali of Kansas Soil," by E. H. S. Bailey and E. C. Case; "Fossil Diatoms," by Gertrude Crotty; "Douglas County Araneinæ" (notes, observations, and a partial list), by F. H. Kellogg; "Notes on Kansas Acrididæ," and "Some Undescribed Mallaphoga," by F. C. Schraeder; "A Preliminary List of Kansas Odonata," by Hattie Fellows; "Specific Inductivity of Certain Alloys," by Louis Russell; "Analysis of Solanum Rostratum," by L. E. Sayre and W. S. Amos; "Telephonic Apparatus for Experimental Purposes," by L. I. Blake and E. W. Caldwell; "Heterœcism in Plants," by W. C. Stevens; "A New Method for Determination of Radiation at Ordinary Temperature," by A. G. Mayer; "A Short Account of the Theory of Geometric Inversion," by H. B. Newson; "Sugar-Making in Cuba," by C. S. McFarland; "Taxidermy as a Fine Art" (illustrated by the stereopticon), by L. L. Dyche.

— At the usual monthly meeting of the Royal Meteorological Society, London, on May 20, W. H. Dines read a paper on "The Vertical Circulation of the Atmosphere in relation to the Formation of Storms." After giving an outline of the circulation of the atmosphere, the author refers to two theories which have been suggested to account for the formation of storms; (1) the convection theory, which is, that the central air rises in consequence of its greater relative warmth, this warmth being produced by the latent heat set free by condensation; and (2) the theory that the storms are circular eddies produced by the general motion of the atmosphere as a whole, just as small water-eddies are formed in a flowing stream of water. The author is of opinion that the convection theory is the more probable of the two, but more information about the temperature of the upper air is greatly needed. A paper on "Brocken Spectres in a London Fog" was read by Mr. A. W. Clayden. During the dense fogs in February last, the author made a number of experiments with the view of raising his own "spectre." This he ultimately succeeded in accomplishing by placing a steady lime-light a few feet behind his head, when his shadow was projected on the fog. He then made some careful measurements of the size and distance of the spectre, and also succeeded in taking some photographs of the phenomenon. Dr. H. Coupland Taylor read a paper on "An Account of the 'Leste,' or Hot Wind of Madeira." The "Leste" is a very dry and parching wind, sometimes very hot, blowing over the island from the east-north-east or east-south-east, and corresponds to the sirocco of Algeria, or the hot north winds from the deserts of the interior experienced in southern Australia. During its prevalence a thin haze extends over the land, and gradually thickens out at sea until the horizon is completely hidden. It is most frequent during the months of July, August, and September, and usually lasts for about three days. Shelford Bidwell exhibited an experiment showing the effect of an electrical discharge upon the condensation of steam. The shadow of a small jet of steam cast upon a white wall is, under ordinary conditions, of feeble intensity and of a neutral tint. But if the steam is electrified, the density of the shadow is at once greatly increased, and it assumes a peculiar orange brown hue. The electrical discharge appears to promote coalescence of the exceedingly minute particles of water contained in the jet, thus forming drops large enough to obstruct the more refrangible rays of light. It is suggested that this experiment

may help to explain the intense darkness, often tempered by a livid yellow glow, which is characteristic of thunder-clouds.

— The May 21 number of *Nature* states that the Göttingen Society of Sciences has recently offered the following prize in physics for Sept. 30, 1893: From the researches of W. Köntgen and A. Kundt on variation of the optical properties of quartz in the electric field, there appears to be a close connection between the electro-optic phenomena and the elastic deformations which that piëzo-electric substance shows under the action of electrostatic forces. An extension of the inquiries to a series of piëzo-electric crystals with various properties of symmetry seems highly desirable. The investigation should also be directed to determining whether the electro-optic phenomena in piëzo-electric crystals are caused exclusively by the deformations occurring in the electric field or, besides, by a direct action of the electrostatic forces on the light-motion. Prize, £25. The German Society for the Encouragement of Industry offers the following (among other) prizes: (1) How far is the chemical composition of steel, and especially the amount of carbon present, a measure of the usefulness of cutting-tools? Prize, a silver medal and £300; date, Nov. 15, 1891. (2) A silver medal and £150 for the best chemical and physical investigation of the most common iron paints. Date, Nov. 15, 1894. (3) A gold medal and £150 for the best work on the magnetism of iron. This should comprise a critical comparison of previous observations; also personal observations on steel and wrought iron bars of the most various chemical composition possible, examination being made both of the strength of temporary magnetization with absolutely measured and varying magnetizing force, and the strength of permanent magnetism and its durability with regard to temperature-changes and vibrations. Date, Nov. 15, 1893. (4) Investigation of the trustworthiness of the usual methods of determining the carbon in iron. Prize, a silver medal and £150; date, Nov. 15, 1892.

— At the Montreal meeting of the Royal Society of Canada, on May 27, papers were read as follows. In the section on English Literature, History, and Archæology, "Opportunities for the Study of Folk-Lore in Canada," by John Reade; "The Bethucks or Red Indians of Newfoundland," by Dr. Patterson; "Notes and Observations on the Shuswap People of British Columbia," by Dr. George M. Dawson; "Grammar of the Haida Language, Queen Charlotte Islands," by Charles Harrison (communicated by Dr. George Dawson); "Descriptive Notes on Certain Implements, Weapons, etc., from Graham Island," by Alex. MacKenzie (communicated by Dr. G. M. Dawson). In the section on Mathematical, Physical, and Chemical Sciences, the following papers were read: "De la Certitude dans les Sciences d'observation" (presidential address), by Monsignor T. E. Hamel; "Automatic and Multiplex Telegraphy," by F. N. Gisborne; "The Use of a Symbolic Form of de Moivres Function," by Professor N. F. Dupuis; "An Attempt at Deducing the Pressure Under which a Steam Boiler Explodes from the Dynamic Effects Produced by the Explosion" and "A Steam Boiler Explosion at Sillery, near Quebec," by C. Baillargé; "Establissement des Formules de Wrouski relatives a le Mécanique celeste," by Dr. A. Duval; "The Variation with Temperature and Concentration, of the Absorption Spectra of Aqueous Solutions of Salts," "The Density of Weak Aqueous Solutions of Nickel Sulphate," and "The Relativity of Force and the Third Law of Motion," by Professor J. G. MacGregor; "The Synthesis of a New Di-Quinoline," by Dr. R. F. Ruttan (communicated by Dr. Girdwood); "Faraday's 'Lines of Force:' Suggestion of a Name," and "Newton's Use of the Slit in the Formation of the Spectrum," by Alexander Johnson; "A New Oxy-Ether Lamp," by G. R. Prowse (communicated by Dr. Johnson); "Memoranda as to Preparations for the Proposed Telegraphic Longitude Determination: Greenwich-Montreal," by Professor McLeod (communicated by Dr. Johnson); "Observations of Sun Spots; May, 1890, to May, 1891," by Professor McLeod (communicated by Dr. Johnson); "The Time-Unit" and "The Hour Meridians," by Dr. Sanford Fleming; and "Moral and Personal Elements in Statistics," by George Hague (communicated by Sir William Dawson). In the section on Geological and Biological Sciences papers were read as follows: "The Probable Occurrence of Gold-bearing Rocks in New Brunswick," by Professor L. W. Bailey; "Notes on the Pleistocene Plants of Canada, with Descriptions of New Species from the United States," by Professor D. P. Penhallow; "The Geological Formation of Quebec, South of the River St. Lawrence," by R. W. Ells (communicated by J. F. Whiteaves); "The Present State of Botany in the Dominion of Canada, with Suggestions as to Promising Lines of Investigation, and a Proposal for United Effort in Systematic Observation throughout the Several Provinces and Territories," by George Lawson; "Note on Carboniferous Batrachians, by Sir William Dawson; "Parka decipiens. — Notes on Specimens from the Collections of James Reid," by Sir William Dawson and D. P. Penhallow; "Hibernation: a Preliminary Communication," by Professor Wesley Mills; "The Orthoceratidæ of the Cambro-Silurian Rocks of Manitoba" and "The Ammonites of the Cretaceous Rocks of the Valleys of the Peace and Athabasca Rivers," by J. F. Whiteaves; "The Geology of the St. Clair Tunnel," by Frank D. Adams (communicated by Sir William Dawson); "Observations on the Distribution and Habits of Some New Brunswick Fishes, including New Forms Lately Identified," by Philip Cox (communicated by Professor Bailey); "Illustrations of the Fauna of St. John Group, No. 6," by G. F. Matthew; "Three Deep Wells in Manitoba," by J. B. Tyrrell (communicated by Dr. G. M. Dawson); and "The Sequence of Strata forming the Quebec Group of Logan and Billings, with Remarks on the Fossil Remains Found Therein," by Henry M. Ami (communicated by Dr. G. M. Dawson).

— The *Perak Government Gazette* states that a portion of an ethnographical collection formed by Signor G. B. Cerruti, in the island of Nias, has been recently acquired by the Government of Perak for the museum. Pulo Nias, as described in *Nature*, is one of a chain of islands bordering the south-western coast of Sumatra. The population is said to be numerous and of one race, though divided into many tribes under independent chiefs. Head-hunting is as common with them as it used to be in Borneo, and most of the houses have skulls hung up in them. Their weapons consist of iron-headed spears, mostly barbed, knives of two patterns, somewhat resembling the Kadubong Achi, with shields of two distinct types. No bows and arrows or blow-pipes seem to be known, nor are throwing-sticks applied to their spears; boats also are not used by them, though rafts are sometimes made to cross rivers on. The ironwork of their weapons is fashioned by themselves, and the upright double cylinder bellows is used to supply wind to their forges — the same in every respect as those used by the Semangs of Upper Parak, and the far-away Malagasy. Helmets of black *ijoh* fibre are worn, somewhat similar to the cocoanut-fibre ones of the Sandwich Islanders. Woven body armor is in use, in the shape of thick coats made of what appears to be the fibre of *Hibiscus tiliacens*. Buffalo hide armor is also said to be used, but is not represented in this collection. Attached to the sheaths of some of the knives are four or five animals' teeth, such as tigers, rhinoceros, etc., also a small carved wooden idol, and one or more bamboo boxes containing stones. In those examined there were twelve pebbles in each box. These stones are supposed to have been taken from a spot on which a man had been slain. All these charms are tied up into a bundle with red cloth, and bound with string on the upper front part of the sheath of the knife.

— A comprehensive study of the influence of forests on the daily variation of air-temperature has been recently made by Professor Müttrich (*Nature*, May 21), the data being from stations in Germany and Austria. *Inter alia*, this influence is greater in May to September or October than in the other months. In pine and fir woods it rises gradually from January to a maximum in August or September, then falls more quickly to a minimum in December; but in beech woods a minimum occurs in April, then there is a quick rise, till the maximum is reached in July. The daily variation itself is greatest in May or June, both in forest and open country. The influence of the forest is to lower the maxima and raise the minima, and the former influence is in most months greater than the latter; in December and January, and occasionally in neighboring months, it is less. The influence on the maxima in

summer is greatest in beech woods, less in pine, and least in fir. The absolute value of the influence in woods of a given kind of tree is affected by the degree of density of the wood, being higher the denser the wood. The character of the climate (oceanic or continental) also affects the results. From daily observations in forest and open country, every two hours in the second half of June, it appears that, soon after 5 A.M. and 8 P.M., the air-temperature in the wood was equal to that in the open; that the maximum was about 0.9° lower in the wood, and the minimum 0.6° higher; that in May to September the difference sometimes reached 2.7°; that the maximum in the wood occurred about half an hour later, and the minimum a quarter of an hour earlier, than in the open; and that the daily mean air-temperature was about one-third of a degree less in the wood.

— Dr. F. M. Chisolm states, in the *American Journal of Ophthalmology*, that two curious cases, one an adult, and the other a child of ten years, presented the following physiological freak. When first noticed by the patient, it was supposed to be dirt; and when examined it presented a dark bluish line, about half an inch in length, running vertically up from the ciliary border. Under a magnifying glass it was recognized as the shaft of a hair that, in process of growth, had its tip caught as it was emerging from its follicle in the epithelium, and growth had pushed it onwards, wedging aside the epithelium, until it had gained its usual limit of size.

— The extraordinary collection of mummies, papyri, and other objects of antiquarian interest recovered last February at Dehr-el-Bahari, is now safely housed in the Ghizeh Museum. According to the Cairo correspondent of the London *Times*, all the objects are in good condition, although some anxiety was caused by the protracted journey by boats from Luxor. The correspondent says that the mummies mostly belong to the 21st Dynasty, and, though styled Priests of Ammon, are supposed to be the corpses of generals and other official dignitaries who bore ecclesiastical besides other titles. The 163 mummies and the 75 papyri are not yet unrolled, and it is difficult to form an estimate of their archæological value, as many of the sarcophagi bear different names on the outer and inner casings, whilst others have the names usually inscribed on the outer casings intentionally effaced. M. Grébaut thinks that, owing to this circumstance and the magnitude of the collection, some time will be required before any important communications can be made to the scientific world.

— A series of experiments has been lately made by Herr Rubner with regard to the familiar fact that not only dry high temperatures are more easily borne than moist, but dry cold causes much less discomfort than moist cold. Dogs, fasting or fed, being observed in an air calorimeter, it appeared that, in all cases, moist air increased the loss of heat by conduction and radiation. For every variation of the air-moisture one per cent, heat was parted with to the extent of 0.32 per cent. In a previous investigation, says *Nature*, Herr Rubner demonstrated the lessened yield of water by evaporation from animals where the air-moisture is increased, involving lessened loss of heat. Here, then, are two antagonistic influences. He is disposed to regard the increased radiation and conduction in moist air as the primary action, and the diminished evaporation as secondary. The colder feeling of moist cold than dry is readily explained by the increased heat radiation. In moist heat, with the sense of oppression it brings, this factor passes rather into the background. The degree of temperature, and some other influences, of complex nature, also affect the amount of radiation.

— The Seventh International Congress of Hygiene and Demography will be held in London, Aug. 10 to 17. The meetings of the Section of Preventive Medicine will be held under the presidency of Sir Joseph Fayrer in Burlington House, Piccadilly, on Aug. 11 to 14, between 10 A.M. and 4 P.M. On Tuesday, Aug. 11, after a short address by the president, a discussion will be held upon "The Mode of Preventing the Spread of Epidemic Disease from one Country to Another." The discussion will be opened by Surgeon-General J. M. Cunningham, C.S.I., of London. On Wednesday a discussion will be held upon "Diphtheria, with Special Reference to its Distribution, and to the Need for Comprehensive and Systematic Enquiry into the Causes of its Prevalence in Certain Countries or Parts of Countries, with a View to its Prevention." The discussion will be opened by Dr. Edward Seaton of London, and continued by leading representatives of France and America. On Thursday a discussion will be held upon "The Relation of Alcoholism to Public Health, and the Methods to be Adopted for its Prevention." The discussion will be opened by Sir Dyce Duckworth, LL.D., M.D., of London, and by Professor Westergaard of Copenhagen. On Friday papers on miscellaneous subjects will be read and discussed. A list of papers accepted by the section will be published later. Gentlemen who are desirous of joining the congress and taking part in any of the discussions, or of communicating papers on other subjects within the scope of the section, are requested to inform the honorary secretaries of the section before June 15. Abstracts of papers to be read in the section must be furnished to the honorary secretaries not later than June 15; and the full text of the papers before July 15. Communications respecting the section should be addressed to Dr. Isambard Owen, 40 Curzon Street, London, W.

— In a paper recently published in the *Meteorologische Zeitschrift*, of which a brief abstract appears in *Nature* of May 21, Professor Hellman of Berlin shows, from observations taken at different British, Continental, and American stations at which barographs are used, that there exists a close coincidence in the daily range of the monthly extremes and in that of the hourly values of the barometer. He finds that the hours of occurrence of the highest and the lowest readings of the barometer during a month agree almost completely with the times in which the normal daily range has its maxima and minima, both curves being so similar in shape that it may be possible to judge of the general character of the daily range of the barometer from knowing only the hours at which the monthly extremes mostly occur. Hence, as the lowest readings of the barometer are accompanied by cloudy and stormy weather, during which the effect of the solar radiation upon the surface of the earth and the heating of the lower strata of the atmosphere are quite insignificant, Professor Hellmann concludes that Professor Hann and others are right in assuming that the normal daily range of the barometer is chiefly an effect of the absorption of the solar rays in the upper strata of our atmosphere. Professor Hann has applied the harmonic analysis to the numbers furnished by Professor Hellman, and, by combining several stations in a group, has found the coefficients of the periodic formula to be practically the same as those for the normal daily range. We should, however, like to see a further confirmation with respect to the coincidence of the lowest readings and the diurnal minima, since the lowest readings occur so frequently during the passage of a severe storm, which can scarcely be said to have any agreement with the ordinary diurnal fluctuation.

— The first paper in the last volume of "Transactions of the Seismological Society of Japan," says *Nature*, is by Mr. Bertin, and describes the double oscillograph and its employment for the study of rolling and pitching. It traces curves automatically, showing the motion produced in a floating body by waves. The second paper is on the "Seiches" of lakes, by Dr. F. A. Forel of Geneva, and discusses those variations in the level of the water of lakes with the investigation of which the author's name has been associated for some years past. Professor John Milne describes the remarkable instrument invented by him for measuring and recording the oscillatory movements of railway trains. Mr. Mason contributes a paper, accompanied by carefully compiled tables, demonstrating the importance of elaborating some uniform system of time-keeping for the purposes of seismological observations. Professor C. G. Knott, in his paper on earthquake frequency, explodes two of the time-honored delusions of the popular mind in regard to earthquakes, viz., that they are more frequent during the night than the day, and that their periodicity is connected with lunar culminations. Mr. Otsuka gives an interesting account of the great earthquake that visited Kumamoto in July, 1888; and Mr. Pereira contributes a carefully compiled record of all the earthquakes noted by him in Yokohama from March, 1885, to December, 1889. Mr. W. E. Forster writes on earthquakes of

non-volcanic origin, caused, it is suggested, by the displacement of masses of land beneath the ocean. The volume concludes with various reports and papers by Professor Milne, such as diagrams of earthquakes recorded in Tokio, a report on earthquake observations made in Japan during the year 1889, and an essay on the connection between earthquakes and electric and magnetic phenomena, which is full of matter of an interesting and suggestive kind.

— Elementary organic analyses are commonly effected in laboratories by what are known as combustion processes. The substance to be analyzed is placed in a long glass tube and heated in proximity to copper oxide, etc., and the products of combustion are then examined. Electricity has been applied to the analysis of gases in the eudiometer, and also in many cases of what are called electrolytic separations. We are not aware, however, says the London *Electrical Review*, that it has been applied to the analysis of organic substances until quite recently. J. Oser has just worked out an entirely new method, which may be described as electro-thermal. The new method partakes of the nature of the old combustion process, of which it is really, perhaps, a modification. The substance to be burnt is placed in a small porcelain dish which is surrounded by a coil of thin platinum wire, and is contained in an ordinary hard combustion tube. A stream of pure oxygen gas is allowed to flow steadily along the tube, and at the same time the platinum wire is heated to redness by means of an electric current, the wires being kept insulated by passing through narrow apertures in a porcelain cylinder fitting into the tube. In order to insure perfect combustion, all the products of combustion, together with the excess of oxygen, are led through a narrow aperture in the porcelain cylinder filled with granular copper oxide and heated to a high temperature by an electrically ignited platinum wire which also passes through this aperture. A number of precautions appear to be necessary in order to insure satisfactory results by this method, and these, together with a table of numerical results which Oser has obtained, are given in the original paper. Oser is engaged in attempting to develop his method so that in one apparatus may be determined both the elementary analysis and the heat of combustion of any given organic substance.

— As it is desirable that uniform usage in regard to geographic nomenclature and orthography should obtain throughout the executive departments of the Government, and particularly upon the maps and charts issued by the various departments and bureaus, the following persons, who have heretofore co-operated for a similar purpose under the authority of the several departments, bureaus, and institutions with which they are connected, have been appointed by the President as a Board on Geographic Names. Professor Thomas C. Mendenhall, United States Coast and Geodetic Survey, chairman; Andrew H. Allen, Department of State; Capt. Henry L. Howison, Light-House Board, Treasury Department; Capt. Thomas Turtle, Engineer Corps, War Department; Lieut. Richardson Clover, Hydrographic Office, Navy Department; Pierson H. Bristow, Post Office Department; Otis T. Mason, Smithsonian Institution; Herbert G. Ogden, United States Coast and Geodetic Survey; Henry Gannett, United States Geological Survey; and Marcus Baker, United States Geological Survey. This board has just issued a bulletin in which it lays down the following principles, adopted for guidance in determining the official form or rendering of geographic names (*A.*—Within the United States): (1) That spelling and pronunciation which is sanctioned by local usage should in general be adopted; (2) Where names have been changed or corrupted, and such changes or corruptions have become established by local usage, it is not in general advisable to attempt to restore the original form; (3) In cases where what was evidently originally the same word appears with various spellings, sanctioned by local usage, when applied to different features, these various spellings should be regarded as in effect different names, and, as a rule, it is inadvisable to attempt to produce uniformity; (4) Where a choice is offered between two or more names for the same place or locality, all sanctioned by local usage, that which is most appropriate and euphonius should be adopted; (5) The possessive form should be avoided whenever it can be done without destroying the euphony of the name or changing its descriptive application. (*B.*—In foreign countries): (6) Geographic names in countries that use the Roman characters should be rendered in the form adopted by the country having jurisdiction, except when there are English equivalents already fixed by usage. In cases where the English equivalent is so different from the national form that the identity of the latter with the former might not be recognized, both forms may be given; (7) The spelling of geographic names that require transliteration into Roman characters should represent the principal sounds of the word as pronounced in the native tongue, in accordance with the sounds of the letters in a system published by the board. An approximation only to the true sound is aimed at in this system. The vowels are to be pronounced as in Italian and on the continent of Europe generally, and the consonants as in English.

— Platinum and palladium crystals may be made by placing topaz dust on a ribbon of the metal heated to a white heat by an electric current, the crystals appearing on the topaz.

— According to the *Colonies and India*, Mr. Alexander McPhee, a West Australian bushman, who has steadily been earning fame lately by his explorations in the central regions of Australia, started inland from Roebourne in July last on another tour of discovery, taking back at the same time an albino aboriginal whom he found and brought to Melbourne a couple of years since. News has been received from which it appears that Mr. McPhee, with the albino, Jun Gun, and a "black fellow" named Timothy, went along the coast some 250 miles to a station called Yinadong, when the party turned inland in an easterly direction. After travelling about 350 miles, Mr. McPhee came upon another albino, a boy of fourteen years, whom he describes as the most extraordinary specimen of humanity he ever saw. One old man in this camp told Mr. McPhee that when he was a boy he heard of a party of whites and horses dying a long way inland. The old fellow could give no particulars about this party, but Mr. McPhee feels certain, owing to his acquaintance with the habits and customs of the blacks, and being thoroughly conversant with their dialect, that a party of white men perished about forty years ago somewhere in the interior. He heard of Warburton's party, and saw a native who told him that he guided them to water. He also heard of two parties of whites who had lately been in the desert, but turned back. From his turning point to the coast of La Grange Bay, Mr. McPhee reckons he was about 250 miles in a south-east direction from that bay. He found the natives very friendly, and on no occasion was it necessary to keep a watch. The country is described as very poor. The only birds observed during the journey were an odd crow and a few sparrows about the water. Not a track of a kangaroo or emu was seen.

— The settlement of a purely philological question (that, namely, as to the position of the French accent), by a physical method, has been recently attempted by Dr. Prigsheim of Berlin. According to *Nature*, the instrument used was König and Scott's phonautograph, into which a number of Frenchmen were required to speak, the measurement of the record being aftewards made by means of a tuning-fork curve running parallel with it. This instrument renders possible a determination of the duration, pitch, and intensity of each syllable, and Dr. Prigsheim discusses its indications. As a preliminary result, he finds that two-syllable words have the vowels pronounced with equal length and strength. Noteworthy differences appear in the curve of a word according as it occurs in the middle or at the end of a sentence. In the latter case, there is added to the characteristic word curve a terminal curve with declining pitch and strength, which is nearly the same for different words, and corresponds to the sinking of the voice before a pause. The vowels and consonants show characteristic curves; and notably long wave-lengths occur with *n*, *l*, *b*, and *d*. The duration of syllables varies between 0.1 and 0.5 second; and between the syllables of a word there are often pauses of 0.03 to 0.2 second. The shortest syllable *é* in *été*, with rather slow pronunciation, consisted of 22 vibrations; yet the ear is capable of not only hearing the tone, but of detecting fine shades and differences in the mode of pronunciation. Further experiments in this direction, with an improved apparatus, are contemplated.

# SCIENCE:

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Attention is called to the "Wants" column. All are invited to use it in soliciting information or seeking new positions. The name and address of applicants should be given in full, so that answers will go direct to them. The "Exchange" column is likewise open.


## PLAYING CARDS FROM JAPAN.

THE history of playing cards, their introduction into Europe from the East by the gypsies or by the home-returning Crusaders, the change and development they underwent while being adapted from the cards of the Orient and altered into those that are familiar to our eyes, have been dwelt upon by numbers of writers; but the cards used in Japan have not been mentioned in any of the best known histories, although they are more distinctly original than any others, and they show no marks of the common origin which the Italian, Spanish, German, French, Hindu, and Chinese cards display.

The Japanese cards, we learn from a paper by Mrs. J. King van Rensselaer, in the "Proceedings of the National Museum" (Vol. XIII, No. 836), are oblong, and are made of pasteboard. The backs are painted black, with none of the checkered dotted marks which usually decorate European cards. The designs seem to be stencilled, and are brightly and appropriately colored, and then covered with an enamel or varnish, which makes them quite as slippery as our own. They are very much smaller than our cards, being a little more than two inches long by one broad.

Forty-nine in number, they are divided into twelve suits of four cards in each suit. One card is a trifle smaller than the rest of the pack, and has a plain white face not embellished with any distinctive emblem, and this one is used as a "joker." The other cards are covered with designs that represent twelve flowers or other things appropriate to the weeks of the year. Each card is distinct and different from its fellows, even if bearing the same emblem, and they can be easily distinguished and classified, not only by the symbolic flowers they bear, but also by a character or letter that marks nearly every card, and which seems to denote the vegetable that represents the month. The only month that has no floral emblem is August, and that suit is marked by mountains and warm-looking skies.

January is represented by pine trees, which, on two of the cards, are shown against a lurid sky; the third one has a grayish background, that throws the trees into strong relief, and the fourth has a setting sun flecked with light clouds, the pines barely indicated in front of it, and the greater part of the card covered with the figure of a huge white-bodied, red-eyed stork.

February displays as its emblem a plum blossom, the four cards devoted to this month bearing its flower in various positions.

March has a red cherry blossom, and April the hanging tendrils of the wistaria vine. On one of the cards of this suit is a wee yellow-bird, which is flying across its surface under a crimson cloud.

For May there are beautiful blue iris springing from long spiky leaves. One card shows in one of its corners part of a dock or pier, and also the water, out of which the flower is lifting its lovely head.

June is represented by blood-red peonies, over one of which two yellow butterflies are hovering.

On July's cards star-shaped leaves, some yellow, some red, and some black, are scattered over their surfaces. These leaves resemble those of our gum or liquid amber trees, but they bear the Japanese name of *hägi*. On one of the cards belonging to this suit a deer is represented standing under the branches of this strangely-hued tree. This is the only figure which recalls in any way the emblems used on cards belonging to other nations, as on one of the Chinese cards is found either a deer or else Chinese characters which have been translated to mean "This is a deer."

August is represented by four pictures of grass-covered mountains, in three of which they are sharply defined against a clouded blue sky, and in the fourth the sun, looking hot and sultry, beams down on a treeless hill. Three birds fly across the sky on one of these cards.

September bears the Mikado's flower, a yellow and red chrysanthemum; October, a maple tree with red or yellow leaves; and on one card is a yellow boar trotting off towards the symbolic tree.

November shows on one of its cards a willow sharply outlined against a leaden sky. The willows on a fellow-card look wind-tossed, and a long-tailed bird skims across the sky. A third card is covered with inky clouds, torrents of rain, and strange zigzags resembling forked lightning. The fourth card of this suit bears a quaint figure of a man rushing through the storm under the willow trees and dropping his sandals in his haste, his head covered with a huge yellow umbrella. Streaks of lightning surround the little figure, and the storm of rain is well depicted in the picture.

December bears the imperial Japanese plant *kiri*, and over one of these flowers hovers a beautiful red-crested silver-winged pheasant.

An infinite variety of games are played with these cards, as there is a shade of difference in each one of each set, and in some games each has a separate value. The favorite game in Japan at present is very like cassino, in which any card of a set may take any other, but all have their own values in the final count.

## HEMP CULTIVATION IN THE PHILIPPINE ISLANDS.

THE Manila hemp plant, which is very similar to the banana or plantain, thrives best in soil composed of decayed vegetable matter, the principal districts in the Philippine Islands in which it is cultivated being reclaimed forest land. The yield, according to Mr. Gollan, British consul at Manila, is more abundant on hilly land than on low-lying flat ground, and the volcanic nature of the soil of the islands seems to be particularly adapted to the growth of the plant. The production is chiefly in the southern districts, where the rainfall is greater than in the vicinity of Manila. The trees suffer severely from excessive heat and drought. The custom in the Philippines is, after clearing the land, to plant small plants of about three feet high, leaving a space of from two to three yards between, the young shoots which spring up later around the parent stems filling up the intervening space. The ground is carefully cleaned and weeded at least twice a year.

As a rule it takes about three years to produce a full crop, but in a favorable soil a crop of about one-third the full production would be available in two years after planting, the second crop the following year would yield about two-thirds, and by the fourth year a full crop would be obtained. The trees are ready for cutting when the first shoots begin to be thrown out. When the trees have matured and are ready for cutting, they are cut down about a foot from the ground, and layers are stripped off the trunk. These layers are then cut into strips about three inches in width. The strips are then drawn between a blunt knife and a board, to remove the vegetable matter from the fibre, which latter is placed in the sun to dry. As soon as it is thoroughly dried it is ready for the market.

The appearance and consequent value of the fibre depends mainly upon the care taken in drying it, as should it be exposed to rain and not completely dried, it becomes discolored, assumes a brownish tint, and loses its strength to a considerable extent. The outside layer produces a reddish-colored fibre, which is quite sound, and easily distinguishable from spoiled hemp, but fetches a lower price in the market.

The cost of preparing and planting a *quinon* (about seven acres), and keeping it clean up to the time of the first crop, is estimated at from two to three hundred dollars, not including the first cost of the land; and afterwards an annual outlay of about sixty dollars would be required to keep the soil free from weeds, etc. The extent of land mentioned, after the plantation is three years old, would produce from sixteen to twenty bales per annum, according to the quality of the soil.

Almost without exception, landowners who devote themselves to the production of hemp in the Philippine Islands are European Spaniards, or natives of the islands, and a foreigner would have considerable difficulty in establishing himself, and would meet with many obstacles before he found himself in touch with his surroundings. Foreigners can only own land in the Philippine Islands under the following conditions, which are strictly enforced: (1) That they reside in the Philippine Islands, and are duly registered in the books of their respective consulates and of the government. (2) That their lands be sold, should they leave the islands and establish their domicile elsewhere. (3) That, in the event of the death of a landed proprietor, his heirs be compelled to reside within the territory of the Philippine Islands, or sell the property. The acquisition of land by foreign companies or associations is absolutely prohibited.

The cost of native labor is about twenty or twenty-five cents a day; but the principle upon which the hemp plantations are worked is, that the laborer gets one half of the result of his work, the other half going to the proprietor. A laborer, under pressure, can clean about twenty pounds of hemp per day; but, as a rule, the quantity cleaned by one man, working steadily day by day, averages about twelve pounds. Many unsuccessful attempts have been made to improve upon the primitive knife and board, which are, up to the present, the only means used for cleaning the fibre. The great faults of the new inventions have been the weight of the machine, and the additional liability to break the fibre. A necessary requirement for any new machine which would replace the present method is, that it should be light enough to be easily carried about by the workmen from place to place on the plantation. The exports of hemp from the Philippine Islands, in 1890, amounted to 63,270 tons, which, at the average price for the year, realized about ten and a half million dollars.

## THE ELECTROLYSIS OF ANIMAL TISSUES.

THE first number of "Studies from a Physiological Laboratory, Owen's College, Manchester," contains a paper by G. N. Stewart, which is an interesting contribution to our limited knowledge of the action of electricity in relation to animal tissues. From an abstract of this paper, which we find in a recent number of the London *Electrical Review*, it seems that practically the whole of the conduction in animal tissues is electrolytic, and the electrolytes are principally the mineral salts, changes in the proteids being produced by secondary electrolytic actions.

In simple proteid solutions, conduction occurs with great difficulty if mineral salts are absent, or if they are present only in small proportions. The effects on the proteids themselves in saline solutions vary somewhat with the current density. Alkali-albumin is formed at the cathode, and acid-albumin at the anode; while in solutions of coagulable proteids there is also coagulation at the latter pole. With a strong current, the proportion of coagulated proteid to acid-albumin is greater than with a weak current. In bile and urine it was observed that the conduction is also chiefly due to electrolysis in the mineral substances, and not in the organic substances contained in these secretions. In blood, the changes which take place in the proteids are similar to those which are mentioned above. There is also a formation of acid-hæmatine (mixed with or preceded by methæmoglobine with certain strengths of current) and of alkali-hæmatine at the anode and cathode, respectively. There is no evidence that hæmoglobine or any of its derivatives can act as an ion.

In muscle the nuclei become apparent and the sarcous substance granular at the anode; this is the appearance always produced by a weak acid. At the cathode the fibres become more homogeneous. The chief chemical changes in proteids are, an increase in the neutralization precipitate of the aqueous extract, and a corresponding decrease of the globuline. At the anode the neutralization precipitate is increased, but the amount of globuline is more than correspondingly diminished, because part of this proteid is coagulated. The effects of electrolysis on the salts of the muscles were studied by estimating the ash. Striking changes were found to occur, which, if produced within the living body, would profoundly modify nutrition. The antiseptic action of the current was studied in the case of micro-organisms, and it was found to occur chiefly, if not entirely, around the anode.

In another and later paper specially devoted to the electrolysis and putrefaction of bile, Mr Stewart shows that when bile is electrolyzed in a U tube, changes take place at the negative pole, which are similar to those which occur when bile is allowed to putrefy; that is, the pigment changes to brown through light shades, ultimately becoming yellow. In the early stages of the electrolysis a reversal of the current restores the original color. The anode has an oxidizing, the cathode a reducing, action upon bile. The bile salts are electrolytes, and an acid constituent of these crystallizes at the anode in long needles; but the conductivity of bile salts is small as compared with that of the inorganic constituents of the secretion.

With these results for bile we may compare those obtained by J. B. Haycraft and H. Scofield (Zeit. Physiol. Chem., xiv., 193). In the course of their researches they showed that a play of colors is obtained at the positive pole of a battery (four Grove cells) placed in the bile, indicating successive stages of oxidization: if the negative pole be then placed in the bile, the effects are reversed, indicating reduction.

Mr. Stewart makes some attempt to connect this knowledge of the electrolysis of animal tissues with the application of electrolysis in surgery, and promises a further communication on the physiological aspects of the question.

## LETTERS TO THE EDITOR.

**** *Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

*The editor will be glad to publish any queries consonant with the character of the journal.*

*On request, twenty copies of the number containing his communication will be furnished free to any correspondent.*

### Osteological Notes.

IN my notes published in *Science*, Vol XVI., p. 332, upon the significance of the jugal arch, I stated that although this arch is often composed of three bones, this number was sometimes reduced to two, and in some cases rendered still more rudimentary, but that in no case could the arch be said to be absolutely wanting. Moreover, that the number of bones present, as well as the strength of the arch, depended upon the extent of surface, and upon the amount and form of curvature, and these, in turn, upon the advanced or receded position of the orbit, as also upon that of the articulation of the mandible, whether above, below, or upon a level with the orbital cavity. These also are correlated with the extent of surface presented by the ascending process of the lower jaw with the adjoining crests, processes, fossæ, with the dental series, and necessarily with the muscles of mastication.

I cited the *Carnivora* as presenting the most instructive example of the various points to be considered in connection with the morphology of the arch, every one of these having reference to enormous development and implying great strength and capacity.

I also cited certain of the *Edentata* as exhibiting the exactly opposite condition, —a rudimentary and incomplete arch, with consequent feeble muscular power, no necessity for mastication, and an entire absence of teeth.

In the crania of the *Primates*, the jugal arch is composed of two bones, the zygomatic process of the squamosal, and the malar; which last, resting upon and articulating with the maxilla, is joined with the squamosal process by a serrated suture which inclines downwards and backwards, the amount of the inclination being modified in the various groups of this order. The strength and curvature of the arch also widely vary, as also does the extent to which the various crests and ridges for muscular attachment are developed. In man, the arch is generally slender, slightly curved in its horizontal axis, and presents a very moderate convexity upwards in its vertical curvature. Owing to the very slight horizontal curvature outwards, the temporal fossa is relatively shallow, consequently allowing but little development of the temporal muscle This condition, however, is subject to modifications in the various races of man. The maximum breadth of the cranium is at the jugal arches, and it is at these points that craniologists now take the bi zygomatic diameter of the face.

Humphrey, in his "Human Skeleton," in speaking of this arch, says: "The upper surface of its root forms a smooth channel for play of the temporal muscle. In the negro the greater width of this channel throws out the zygoma into stronger relief, and, added to the flatness of the squamosal portion, affords more space for the temporal muscle." In other words, the negro has a more fully developed temporal muscle than the white man; that is, he approaches nearer to the *Carnivora*. This general statement is not confirmed by any cranial measurements, neither does Mr. Humphrey state what he means by a negro — of course, one of the black race. But under the term "black race" are included the Oceanic negroes, as well as the natives of central and southern Africa Probably he intended, as in common parlance, to designate the African, although this designation is ambiguous, as it is well known that the crania of the different tribes of Africa differ very essentially in their general formation, as well as in their special cranial measurements.

Although the cephalic measurements of Broca, Topinard, and others allow a slight increase in the horizontal curvature of the arch in certain instances, which, if they indicate anything, signify a greater development of the temporal muscle, as well as a more extended surface for the attachment of the masseter, both of which, as we have seen, highly characterize the arch in the *Carnivora;* yet, as Topinard remarks, in speaking of the bi-zygomatic diameter, which may be accepted as the criterion of the greatest facial width: "This measurement by itself often presents difficulties, purely accidental and local, and entirely apart from the general type. Thus, in every race, cases occur in which the zygomatic process of the squamosal, instead of joining directly with the molar, bends outwards and then resumes the general characteristic direction of the arch, whether this be straight or gently curved. The greatest width under these circumstances falls upon the summit of the bend, which causes the measurement to be unduly augmented."

As a result of the measurements taken upon the crania of the Africans in the collection of the Peabody Museum, and of the Harvard Medical School, there was a slight increase in the bizygomatic breadth over those of other mixed European skulls. But no dependence should be put in such measurements, for although in one collection the crania were classified in general as African, nothing was known of their history, and still less of those with which they were compared.

According to an extract from M. Pruner-Bey's tables, as given by Topinard, the bi-zygomatic breadth, compared with the total length of the face, is greater in the Esquimo, Chinese, Scandinavians, Germans (south), and New Caledonians than it is in the negroes of Africa. In the category of crania in the British Museum Mr. Flower gives the index of breadth of the African negroes of various tribes. The low conformation of those, in this respect, is only exceeded by the Eskimo, Australians, Melanesians, Kaffirs, and Zulus.

In order to substantiate the statement made by Mr. Humphrey it would seem to be much the most scientific method to ascertain by measurement the actual width of the groove in the upper surface of the posterior root of the zygoma of the African skull, and compare this with that of other races. This can be properly effected by taking first the bi zygomatic breadth, and then the bi-squamosal at the most prominent point on the line of suture between the squamosal and alisphenoid, the difference between the two measurements would give the breadth of groove.

Cuvier reminds us that the size of the temporal fossa and its muscle have close relation with the age of the animal. In the young, the brain and its case are developed, but the jaws are small, and the forces which move them are wanting in energy. But with age these last are developed, while the intellectual powers constantly diminish. In civilized man the equilibrium is maintained between the growth of the brain-case, the intellectual powers, and the masticatory organs. Can any relation, however remote, be traced between the developed masticatory powers of the uncivilized negro, and the flattened squamosal in his brain-case as described by Mr. Humphrey? D. D. SLADE.

Cambridge, Mass., May 27.

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### Anatomy of the Apteryx.

BY far one of the most important anatomical papers which has appeared since the present year commenced is a memoir by Professor T. Jeffrey Parker, F.R.S., of the University of Otago, New Zealand, entitled "Observations on the Anatomy and Development of Apteryx." This remarkable bird-form, now becoming quite rare, is so well known to biologists that the several species of the genus will require no special description from me here. Nor will the vast importance to anatomical science of a complete study of its structure and embryology stand in need of comment. What Mr. Parker has accomplished in that direction is now before me, — one of the classical publications of the Royal Society of London, brought out through its Philophical Transactions, it being the work to which I desire to invite attention.

This monograph is in the usual quarto form, and covers 134 pages, and is illustrated by sixteen lithographic plates, beautifully executed in color. These last are devoted to the external characters of the embryo; to sections of the same; to graphic representations of the rate of growth; to the morphology of the skull and skeleton of the young at various stages; and to certain parts of the anatomy of the adult. They include 310 figures. *Apteryx bulleri*, *A. australis*, and *A. oweni* are followed, more or less completely, through fourteen various stages of their growth, the whole resulting in a very full embryological chapter. Among the more important points arrived at by our author are, (1) in the adult *Apteryx*, as well as in advanced embryos, the pterylosis is by no means uninterrupted, as was originally supposed to be the case by Nitsch; (2) that the lateral apterial space has a definite function in connection with the attitude assumed by the bird during sleep; (3) that the study of the structure of the wing of *Apteryx* lends support to the view that the *Ratitæ* are the descendants of birds which possessed the power of flight; (4) the demonstration of the law of growth of *Apteryx*, giving the stages in which the head, beak, brain, sternum, and limbs arrive at their maximum dimensions, and the comparative and relative rates of the growth; (5) the specific and sexual differences; (6) the discovery of nine more muscles in the wing of the adult than were known to Owen, our former authority on the subject; and (7) the presence of the pecten in the eye during embryonic life.

In conclusion the phylogeny is given, and under that caption are arrayed the characters which go to support the view that *Apteryx* is derived from a typical avian form capable of flight. Fifteen characters are well chosen for that purpose, — the only opposed one suggested being the total absence of rectrices in *Apteryx*. This *résumé* is followed by a summary of other sets of characters supporting (1) the derivation from a more generalized type than existing birds, and the converse, (2) as exhibiting greater specialization than other birds. Fifty-five works are given in a list at the close of the monograph, as having been referred to during its production. Only one American authority is mentioned, and we must believe that the important labors of Morse on "The Carpus and Tarsus of Birds" would have been found useful, to say not a word of a number of others.

It remains for me but to say that this admirable paper of Professor Parker's will surely make its influence felt at once, and will

receive a hearty welcome from anatomists in all quarters of the globe, as a most thorough and capable contribution to the subject of vertebrate morphology. R. W. SHUFELDT.

Takoma, D.C., May 29.

## BOOK-REVIEWS.

*The Defences of Norumbega.* By EBEN NORTON HORSFORD. Boston and New York, Houghton, Mifflin, & Co., 1891.

IN this sumptuously published volume, with its numerous reproductions of old maps, its photographic views and engravings, Professor Horsford returns to the arena in defence of his favorite theory that in the eleventh century the Northmen established an important walled city on the site where Watertown, Mass., now stands. He believes that he has discovered its stone-built walls, its ancient stone-paved streets, and the remains of its docks and wharves. Other local antiquaries see in these remains merely the vestiges of some dams, drains, and stone fences of the early New England farmers, and it appears that Professor Horsford has not succeeded in persuading any of the resident investigators of the interpretation he has so much at heart. Furthermore, the most recent and careful study of the Sagas of the Northmen's voyages to America — that by Professor Gustav Storm — declares that the records do not admit of placing the southern limit of their explorations south of Nova Scotia. We must therefore return the Scotch verdict of "not proven," on the evidence before us.

*Civilization: an Historical Review of its Elements.* By CHARLES MORRIS. Chicago, S. C. Grigg's & Co. 2 vols.

MR. MORRIS is known as a fertile writer on topics relating to evolution, and as the author of "The Aryan Race" and some other works. In the volumes before us he undertakes "to set forth the philosophy of human progress and indicate the evolutionary steps by which the world of man has passed upward from primitive savagery to modern enlightment."

In carrying out this plan he selects such subjects as government, war, religion, law, commerce, literature, and the arts, and portrays their growth from a primitive form to that condition in which we find them to-day. This is usually accomplished in a comprehensive and satisfactory manner; but the reader is not unfrequently at a loss, as he is repeatedly in Mr. Morris's "Aryan Race," to distinguish between fanciful hypotheses of the writer and definite results of other investigators, for his pages offer no references as guides, and his assertions usually go unsupported. As a popular work, however, it deserves commendation.

## AMONG THE PUBLISHERS.

THE first number of *Pantobiblion* has just been received from the American publishers, Messrs D. Appleton & Co., New York. This new periodical has its main office in St. Petersburg, and is edited by A. Kersha, a civil engineer. The title-page of the number received is in English, but the text is printed in fifteen different languages. The purpose of *Pantobiblion* is to help those concerned with the applied sciences generally in securing information of the current scientific literature in their specialities. To do this, the journal contains a classified list of all new books in all the principal languages, a series of reviews of the leading scientific publications, and a summary of the contents of current periodical literature. It is intended to add to these, critical notices of the principal articles in scientific periodicals, and a miscellaneous department to be devoted to short notes on current scientific literature. This first number contains 1,200 titles of new publications, 80 reviews, and the "contents" of 270 periodicals. That it may not be thought that this new venture is only for those interested in applied science, it should be mentioned that the subjects included cover a wide range in the physical sciences as well as in engineering, and that botany and geology receive some attention. There has been some delay in getting out this initial number, — a delay which is by no means surprising considering the enormous labor involved in the editing and manufacture of a periodical containing such a mass of disconnected information, — but the following numbers are promised to follow in rapid succession. Whether *Pantobiblion* is to be a financial success or not is more than we can say; but certainly every one interested should take the first opportunity for examining a copy, to see whether it meets his needs. There is such an enormous amount of matter between the covers that the first impression on us is somewhat appalling.

— The University Extension movement takes so prominent a place among the educational influences of the age, says *Nature*, that a good account of the system has for some time been needed. This is supplied in "Eighteen Years of University Extension," by R. D. Roberts (Cambridge, University Press). Mr. Roberts, first as lecturer, then since 1881 as assistant and organizing secretary to the Cambridge Syndicate, and since 1886 as secretary to the London Society, has had the best possible opportunities of studying the new method, and of forming a judgment as to its fitness for the uses to which it is applied. He begins with an account of the origin and growth of the movement, then describes the character of the audiences, the reception of the idea by artisans, and the signs of earnestness displayed by various classes of students. Mr. Roberts also discusses the conditions of success, has a chapter on the consolidation of the work, and presents a summary of results. No essential fact has been omitted, and the general impression which will be left on the minds of most readers probably is that those connected with the movement have done much to foster and to satisfy the desire of a very large number of persons for intellectual training. There are certain rules — some of them rather difficult — with which the system must be brought into accord if it is to be capable of further development; and these are stated with much force and precision in the useful little volume.

— With the June number the *Educational Review* begins its second volume. At this season, when many young men are considering where they will study in Europe, the article on "The Present Condition of the German Universities," by Professor Mattoon M. Curtis, has a timely interest. Other contributions to the number are: "Applications of Psychology in Education," by Dr. Mary Putnam Jacobi, illustrated with twenty-one diagrams; "The American High School," by Ray Greene Huling, president of the American Institute of Instruction; and "The Education of the Will," by Professor J. Clark Murray; a discussion between Mr. Albert L. Arey and Professor Fernando Sanford on "The Use of Text-books in Teaching Elementary Science," and one by Superintendent W. H. Maxwell on "Teachers' Salaries." The reviews are by Professors Jastrow of the University of Wisconsin, Waggener of the University of Texas, Venable of the University of Virginia, Genung of Amherst, Chapin of Wollesley, Myers of the University of Cincinnati, etc. The department of "Education in Foreign Periodicals" includes "Some Characteristics of a Sound Mind," "The School of the Future," and "The School for Oriental Languages at Berlin."

— The "Annual Report" of the Director of the Royal Alfred Observatory, Mauritius, for the year 1889, as quoted in a recent number of *Nature*, shows that the island has again enjoyed immunity from storms. The greatest hourly velocity of the wind was 31 miles. The almost total absence of tropical cyclones in the south Indian Ocean during the year is considered by Dr. Meldrum as another confirmation of the law that these cyclones are fewest in number and least intense in the years of least solar activity. The mean temperature was 0.7° below the average for the last fifteen years, and below the average in every month except July and October. The maximum shade temperature was 93.1° on March 27, and the minimum 52.4° on June 18. The rainfall was 8.56 inches above the average; the greatest fall in one day was 3.88 inches on March 11, although this amount was much exceeded in other parts of the island. On Jan. 1, a waterspout burst on the Pouce Mountain; Port Louis was flooded, and some persons were drowned. The collection of observations made at sea is actively carried on; 324 log-books were received, and the observations duly tabulated. The report also contains observations made at the Seychelles and Rodriguez.

— Silver, Burdett, & Co., Boston, announce "An Elementary Handbook of Potable Water," by Floyd Davis, professor of chemistry in Drake University. Chapter I. of the volume treats of pure water, and defines the terms pure and impure, wholesome and unwholesome, from the sanitary standpoint. Chapter II. is devoted to inorganic constituents; Chapter III., to vegetable con-

stituents; and Chapter IV., to animal constituents. Chapter V. presents a treatise on micro-organisms, Chapters VI., VII., VIII., discuss water-supplies, natural purification, and artificial purification, and Chapter IX. describes eight different systems for central filtration. An appendix, divided into two sections, closes the book. Section A treats of the origin and home of cholera. Section B presents four simple qualitative tests for impurities in drinking-water.

— *Babyhood* for June considers the seasonable question of what to do with children in the city and country, and how to provide for their welfare generally, during the heated term; and a medical paper by Dr. Walter Mendelson, on "Practical Directions for Sterilizing Milk," offers an account of this important subject.

— Several new leaflets are to be added to the general series of "Old South Leaflets," published by D. C. Heath & Co., Boston. All of them are connected with the English Puritan period, and are of value in the study of the development of our own political liberty and of our political system. They include the "Petition of Right," presented by Parliament to King Charles in 1628; the "Grand Remonstrance;" the "Solemn League and Covenant," which gave the name of "Covenanters" to the Scottish Protestants; the "Agreement of the People;" the "Instrument of Government," under which Cromwell began his government; and "Cromwell's First Speech to his Parliament." These leaflets furnish these original documents, heretofore almost inaccessible to the mass of the people, for the few cents covering their cost. There are now nearly thirty in the series.

— Macmillan & Co. will shortly publish "Studies of the Gods in Greece at Certain Sanctuaries Recently Excavated," by Mr. Louis Dyer, formerly assistant professor in Harvard University. The book represents a course of lectures delivered by Mr. Dyer at the Lowell Institute, Boston; but the material has undergone very thorough revision, and notes and appendixes have been added on special points. The same firm are also going to publish "Browning as a Philosophical and Religious Teacher," by Professor Jones of University College. This work deals with Browning, not simply as a poet, but as the exponent of a system of ideas on moral and religious subjects, which may fairly be called a philosophy.

— In the June number of *The Political Science Quarterly* Professor Burgess of Columbia College discusses the international and constitutional questions raised by the recent controversy with Italy. He holds that a foreign government whose subjects have been wronged is entitled to demand that the United States Government should initiate proceedings against wrong-doers in the United States courts. He finds that the Constitution vests in the Federal Government the power to do this, but that Congress has not passed the necessary statutes to make this power effective. Horace White writes on bimetallism in France, showing that all attempts to keep the two metals in equipoise have proved unsuccessful. F. M. Drew gives an account of the organization and

Publications received at Editor's Office, May 27–June 2.

Frazer, Persifor. Tables for the Determination of Minerals by Physical Properties. 3d ed. Philadelphia, Lippincott. 115 p. 8°. $2.

George, Henry. Protection or Free Trade? New York, Henry George & Co. 216 p. 12°. 25 cents.

Glen Echo Chautauqua. Vol. I. No. 1. *m.* Washington, Glen Echo Chautauqua Assoc. 20 p. 4°. 50 cents per year.

Nova Scotia, Annual Report of the Secretary of Agriculture, for the year 1890. Halifax, Government. 310 p. 8°.

Pantobiblion: International Bibliographical Review of the World's Scientific Literature. Vol. I. No. 1. *m.* A. Kersha, ed. (St. Petersburg, Paris, Leipzig, Bologna, London), New York, Appleton. 287 p. 8°.

Sloane, T. O'C. The Arithmetic of Electricity. New York, Henly & Co. 138 p. 12°. $1.

aims of the Farmers' Alliance and kindred bodies. E. J. Renick of the Treasury Department explains and criticises the method of accounting employed by the United States Government. Gaillard Hunt of the Department of State contributes a chapter to the history of the nullification movement in South Carolina, and Professor Osgood of Columbia concludes his study of the political ideas of the Puritans. The number contains also the usual reviews of current political literature, and the semi-annual instalment of Professor Dunning's record of political events.

— Messrs. Houghton, Mifflin, & Co. have published "Noto: an Unexplored Corner of Japan," by Perceval Lowell. It is an account of a journey from Tokyo to a comparatively unknown province on the western coast, a journey, however, which proved rather unsuccessful, owing to the impassability of certain parts of the country. The book is written in an affected style, which is not to our taste, while it gives comparatively little information about the country visited. The author's personality is thrust continually into the foreground — a fault that books of travel are altogether too apt to have. Readers do not care a straw for the author's personal doings and adventures: what they want is a description of the country visited and of the people who inhabit it, and it is strange that travellers do not realize this. Mr. Lowell's book, however, does give some such information, if one has the patience to pick it out from the mass of irrelevant matter in which it is embedded.

— Photographers have long felt the need of a practical text-book on photographic optics, than which no subject connected with their work is more important for them thoroughly to understand. To meet the growing demand for such a text-book the Scovill & Adams Company, of this city, have just published "Photographic Optics," by W. K. Burton. The book is intended for the use of both professional and amateur, has good illustrations, sufficient in number for the purpose in view, and should add to the completeness of every photographer's equipment.